WHAT IS CLAIMED IS:

1. A solar cell comprising a semiconductor solar cell substrate having a light receiving surface formed on a first major surface thereof, and generating photovoltaic power based on the light irradiated on the light receiving surface, wherein the light receiving surface of the semiconductor solar cell substrate is covered with a light-receiving-surface-side insulating film provided as an inorganic insulating film composed of an inorganic insulating material having a cationic component thereof principally comprising silicon, and the light-receiving-surface-side insulating film is configured as a low-hydrogen-content inorganic insulating film having a hydrogen content of less than 10 at%.

2. The solar cell as claimed in Claim 1, wherein a second major surface of the semiconductor solar cell substrate is covered with a back-side insulating film provided as an inorganic insulating film composed of an inorganic insulating material having a cationic component thereof principally comprising silicon, a back electrode is provided so as to cover the back-side insulating film and so as to contact with the back surface of the semiconductor solar cell substrate through conductive portions penetrating the back-side insulating film, and the back-side insulating film is configured as a low-hydrogen-content inorganic insulating film having a hydrogen content of less than 10 at%.

3. The solar cell as claimed in Claim 1 or 2, wherein the hydrogen content of the low-hydrogen-content inorganic insulating film is 5 at% or less.

4. The solar cell as claimed in any one of Claims 1 to 3, wherein the light-receiving-surface-side insulating film is configured as the

low-hydrogen-content inorganic insulating film composed of silicon nitride having a refractive index of 2 to 2.5, both ends inclusive.

5. The solar cell as claimed in any one of Claims 1 to 4, wherein the inorganic insulating film is such as being formed by the catalytic CVD process in which a heat catalyst is placed together with the semiconductor solar cell substrate in a reaction vessel; and a film-forming gas, which comprises a silicon source gas and an anion source gas producing an anionic component capable of binding with silicon in an inorganic material to be obtained, at least either one of the silicon source gas and the anion source gas having hydrogen atoms in the molecule thereof, is supplied to the surface of the semiconductor solar cell substrate while making the film-forming gas into contact with the heat catalyst, so as to deposit an inorganic insulating material produced based on chemical reactions of the film-forming gas on the surface of the semiconductor solar cell substrate.

6. The solar cell as claimed in any one of Claims 1 to 5, wherein the low-hydrogen-content inorganic insulating film is a silicon nitride film formed so as to adjust the Si/N atomic ratio thereof to 0.80 to 1.80, both ends inclusive.

7. The solar cell as claimed in Claim 6, wherein the silicon nitride film has a refractive index of 2 to 2.5, both ends inclusive.

8. The solar cell as claimed in any one of Claims 1 to 7, wherein the back-side insulating film is a silicon nitride film formed, so as to adjust the Si/N atomic ratio thereof to 0.80 to 1.80, both ends inclusive, by the catalytic CVD process in which a heat catalyst is placed together with the semiconductor solar cell substrate in a reaction vessel; and a film-forming gas, which comprises a silicon source gas and a nitrogen source gas, is

supplied to the surface of the semiconductor solar cell substrate while making the film-forming gas into contact with the heat catalyst, so as to deposit silicon nitride produced based on chemical reactions of the film-forming gas on the surface of the semiconductor solar cell substrate.

9. A solar cell comprising a semiconductor solar cell substrate having a light receiving surface formed on the first major surface thereof, and generating photovoltaic power based on the light irradiated on the light receiving surface, wherein a second major surface of the semiconductor solar cell substrate is covered with a back-side insulating film provided as an inorganic insulating film composed of silicon nitride as an inorganic insulating material, and a back electrode is provided so as to cover the back-side insulating film and so as to contact with the back surface of the semiconductor solar cell substrate through conductive portions penetrating the back-side insulating film, and

wherein the silicon nitride film composing the back-side insulating film is formed so as to adjust the Si/N atomic ratio thereof to 0.80 to 1.80, both ends inclusive, by the catalytic CVD process in which a heat catalyst is placed together with the semiconductor solar cell substrate in a reaction vessel; and a film-forming gas, which comprises a silicon source gas and a nitrogen source gas, is supplied to the surface of the semiconductor solar cell substrate while making the film-forming gas into contact with the heat catalyst, so as to deposit silicon nitride produced based on chemical reactions of the film-forming gas on the surface of the semiconductor solar cell substrate.

10. The solar cell as claimed in any one of Claims 1 to 9, wherein the inorganic insulating film is such as being deposited by the catalytic CVD process on the surface of the semiconductor solar cell substrate after being surface-treated by introducing a surface treatment gas into the reaction

vessel, and by supplying the surface treatment gas to the surface of the semiconductor solar cell substrate so as to effect the surface treatment, while making the film-forming gas into contact with the heat catalyst.

11. The solar cell as claimed in Claim 10, wherein the semiconductor solar cell substrate is a silicon substrate, the inorganic insulating film is a silicon nitride film, and the surface-treatment gas is ammonia gas.

12. The solar cell as claimed in any one of Claims 1 to 11, wherein the inorganic insulating film is such as being post-treated after being deposited on the surface of the semiconductor solar cell substrate by the catalytic CVD process, by introducing a post-treatment gas into the reaction vessel, and by supplying the post-treatment gas to the surface of the inorganic insulating film, while keeping the post-treatment gas in contact with the heat catalyst.

13. A solar cell comprising a semiconductor solar cell substrate having a light receiving surface formed on the first major surface thereof, and generating photovoltaic power based on the light irradiated on the light receiving surface, wherein a second major surface of the semiconductor solar cell substrate is covered with a back-side insulating film composed of an inorganic insulating film having a cationic component thereof principally comprising silicon, and a back electrode is provided so as to cover the back-side insulating film and so as to contact with the back surface of the semiconductor solar cell substrate through conductive portions penetrating the back-side insulating film, and

wherein the inorganic insulating film is such as being deposited and formed by the catalytic CVD process in which a heat catalyst is placed together with the semiconductor solar cell substrate in a reaction vessel; and

a film-forming gas, which comprises a silicon source gas and an anion source gas producing an anionic component capable of binding with silicon in an inorganic material to be obtained, is supplied to the surface of the semiconductor solar cell substrate while making the film-forming gas into contact with the heat catalyst, so as to deposit an inorganic insulating material produced based on chemical reactions of the film-forming gas on the surface of the semiconductor solar cell substrate; and such as being post-treated by introducing a post-treatment gas into the reaction vessel, and by supplying the post-treatment gas to the surface of the inorganic insulating film, while keeping the post-treatment gas in contact with the heat catalyst.

14. A method of fabricating a solar cell which comprises a semiconductor solar cell substrate having a light receiving surface formed on the first major surface thereof, and generating photovoltaic power based on the light irradiated on the light receiving surface, the light receiving surface of the semiconductor solar cell substrate being covered with a light-receiving-surface-side insulating film composed of an inorganic insulating film having a cationic component thereof principally comprising silicon, wherein the light-receiving-surface-side insulating film is formed as a low-hydrogen-content inorganic insulating film having a hydrogen content of less than 10 at%, by the catalytic CVD process in which a heat catalyst is placed together with the semiconductor solar cell substrate in a reaction vessel; and a film-forming gas, which comprises a silicon source gas and an anion source gas producing an anionic component capable of binding with silicon in an inorganic material to be obtained, at least either one of the silicon source gas and the anion source gas having hydrogen atoms in the molecule thereof, is supplied to the surface of the semiconductor solar cell substrate while making the film-forming gas into contact with the heat catalyst, so as to deposit an inorganic insulating material produced based on

chemical reactions of the film-forming gas on the surface of the semiconductor solar cell substrate.

15. The method of fabricating a solar cell as claimed in Claim 14, wherein the film-forming gas is supplied to the reaction vessel without being diluted with hydrogen.

16. The method of fabricating a solar cell as claimed in Claim 14 or 15, wherein the inorganic insulating film to be obtained is a silicon nitride film, and the film-forming gas is supplied to the reaction vessel while regulating the ratio of mixing of the silicon source gas and the nitrogen source gas comprising the anion source gas, so as to obtain silicon nitride having the Si/N atomic ratio of 0.80 to 1.80, both ends inclusive.

17. A method of fabricating a solar cell which comprises a semiconductor solar cell substrate having a light receiving surface formed on the first major surface thereof, and generating photovoltaic power based on the light irradiated on the light receiving surface, wherein a second major surface of the semiconductor solar cell substrate is covered with a back-side insulating film provided as an inorganic insulating film composed of silicon nitride, and a back electrode is provided so as to cover the back-side insulating film and so as to contact with the back surface of the semiconductor solar cell substrate through conductive portions penetrating the back-side insulating film, and

wherein the silicon nitride film composing the back-side insulating film is formed by the catalytic CVD process in which a heat catalyst is placed together with the semiconductor solar cell substrate in a reaction vessel; and a film-forming gas, which comprises a silicon source gas and a nitrogen source gas, is supplied to the surface of the semiconductor solar cell substrate while making the film-forming gas into contact with the heat

catalyst, so as to deposit silicon nitride produced based on chemical reactions of the film-forming gas on the surface of the semiconductor solar cell substrate, while regulating the ratio of mixing of the silicon source gas and the nitrogen source gas so as to adjust the Si/N atomic ratio to 0.80 to 1.80, both ends inclusive.

18. The method of fabricating a solar cell as claimed in Claim 17, wherein silane and ammonia are used as the silicon source gas and the nitrogen source gas, respectively.

19. The method of fabricating a solar cell as claimed in any one of Claims 14 to 18, wherein the inorganic insulating film is deposited by the catalytic CVD process on the surface of the semiconductor solar cell substrate after being surface-treated by introducing a surface treatment gas into the reaction vessel, and by supplying the surface treatment gas to the surface of the semiconductor solar cell substrate so as to effect the surface treatment, while making the film-forming gas into contact with the heat catalyst.

20. The method of fabricating a solar cell as claimed in Claim 19, wherein the semiconductor solar cell substrate is a silicon substrate, the inorganic insulating film is a silicon nitride film, and the surface-treatment gas is ammonia gas.

21. The method of fabricating a solar cell as claimed in any one of Claims 14 to 20, wherein the inorganic insulating film is deposited by the catalytic CVD process on the surface of the semiconductor solar cell substrate, and is then post-treated by introducing a post-treatment gas into the reaction vessel, and by supplying the post-treatment gas to the surface

of the inorganic insulating film, while keeping the post-treatment gas in contact with the heat catalyst.

22. A method of fabricating a solar cell which comprises a semiconductor solar cell substrate having a light receiving surface formed on the first major surface thereof, and generating photovoltaic power based on the light irradiated on the light receiving surface, wherein a second major surface of the semiconductor solar cell substrate is covered with a back-side insulating film composed of an inorganic insulating film having a cationic component thereof principally comprising silicon, and a back electrode is provided so as to cover the back-side insulating film and so as to contact with the back surface of the semiconductor solar cell substrate through conductive portions penetrating the back-side insulating film, and

wherein the inorganic insulating film is deposited and formed by the catalytic CVD process in which a heat catalyst is placed together with the semiconductor solar cell substrate in a reaction vessel; and a film-forming gas, which comprises a silicon source gas and an anion source gas producing an anionic component capable of binding with silicon in an inorganic material to be obtained, is supplied to the surface of the semiconductor solar cell substrate while making the film-forming gas into contact with the heat catalyst, so as to deposit an inorganic insulating material produced based on chemical reactions of the film-forming gas on the surface of the semiconductor solar cell substrate; and is then post-treated by introducing a post-treatment gas into the reaction vessel, and by supplying the post-treatment gas to the surface of the inorganic insulating film, while keeping the post-treatment gas in contact with the heat catalyst.

23. The method of fabricating a solar cell as claimed in Claim 21 or 22, wherein the semiconductor solar cell substrate is a silicon substrate, the

inorganic insulating film is a silicon nitride film, and the post-treatment gas is ammonia gas, hydrogen gas, or a mixed gas of both of them.